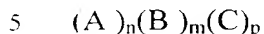


Claims

1. Macromolecular hydrophilic photocrosslinkers having a general formula



capable of producing, upon exposure to light, crosslinked networks, wherein

- (i) A, B and C are units of substituted ethylene groups in the macromolecular
10 structure;
- (ii) A, B and C are randomly distributed and the unit C carries a photoactive group;
- (iii) $n = 0-98$ mole %, $m = 0-98$ mole %, $n+m = 50-98$ mole % and $p = 0.5-50$ mole %;

and when said photoactive groups are exposed to light of determined wavelengths above
15 305 nm, radicals are generated and retained on the macromolecular photocrosslinkers and
reacting so as to accomplish a crosslinked network structure.

2. Photocrosslinkers according to claim 1 characterized in that said photoactive group
comprises a phosphine oxide.

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3. Photocrosslinkers according to claim 2 characterized in that the photoactive group is an
acyl- or aroyl phosphine oxide.

4. Photocrosslinkers according to claim 3 characterized in that the photoactive group is
25 linked to the ethylene groups of units C by a linking group comprising a phenylene
group, said phenylene group being optionally substituted.

5. Photocrosslinkers according to claim 3 characterized in that the photoactive group is
linked to the ethylene groups of units C by a linking group comprising a group having the
30 structure

-O-C(O)-NH-.

6. Photocrosslinkers according to claim 5, wherein the linking group has the structure of -O-C(O)-NH-Ph-, wherein Ph denotes an optionally substituted phenylene group.

7. Photocrosslinkers according to claim 1, wherein the ethylene units A, B, C of the macromolecular structure comprises substituents in accordance with:

A = -CH₂-C(R¹R²)-, B = -CH₂-C(R¹R³)-, C = -CH₂-C(R¹R⁴)-, wherein

R¹ is hydrogen or methyl;

R² is -CON(Me)₂, -CO₂CH₂CH₂OH, -OCOCH₃, -OCOCH₂CH₂Ph, -OH or a lactam group;

R³ is -CON(Me)₂, -CO₂CH₂CH₂OH, -OCOCH₃, -OCOCH₂CH₂Ph, -OH or a lactam group when B is -CH₂-C(R¹R³)- with the proviso that R² and R³ are not the same unless R² and R³ is -OH; and

R⁴ is -R⁵C(O)P(O)R⁶R⁷ or -R⁵P(O)R⁶OC(O)R⁷, wherein R⁵, R⁶ and R⁷ are selected

among same or different aryl groups comprising phenyl, methylphenyl, dimethylphenyl, trimethylphenyl, methoxyphenyl, dimethoxyphenyl, trimethoxyphenyl, methylolphenyl, dimethylolphenyl, trimethylolphenyl or styryl radicals, or

R⁴ is -R⁸C(O)P(O)R⁹R¹⁰, wherein R⁹ and R¹⁰ are the same as R⁵, R⁶ and R⁷ above, but R⁸ is a group -O-C(O)-NH-R¹¹, wherein R¹¹ is the same as R⁹ and R¹⁰.

8. Photocrosslinkers according to claim 7, wherein R² and R³ are selected so as to form a water-soluble molecule.

9. Photocrosslinkers according to claim 7, wherein said lactam units together with units A or B constitute N-vinylpyrrolidone units.

10. Photocrosslinkers according to claim 7, wherein at least one of R^2 and R^3 is hydroxyl.

11. Photocrosslinkers according to claim 7, wherein A is N-vinylpyrrolidone, B is vinyl
5 alcohol.

12. Photocrosslinkers according to claim 7, wherein R^4 is $-O-C(O)-NH-R^8-C(O)P(O)R^9R^{10}$.

13. Photocrosslinkers according to claim 1 or 7 provided with functional groups for
10 crosslinking.

14. Photocrosslinkers according to claim 13 provided with functional groups selected
among vinylic, acrylic and methacrylic groups.

15. A method of preparing a photocrosslinker from a hydrophilic macromolecule



- (i) A, B and C are units of substituted ethylene groups in the macromolecular structure;
- 20 (ii) A, B and C are randomly distributed and at least the unit C carries a hydroxyl group;
- (iii) $n = 0-98$ mole %, $m = 0-98$ mole %, $n+m = 50-98$ mole % and $p = 0.5-50$ mole %;
- by reacting said macromolecule with an isocyanate substituted photoactive agent having the structure $-C(O)=N-R^8-C(O)P(O)R^9R^{10}$, wherein R^8 , R^9 and R^{10} are selected among
- 25 same or different aryl groups comprising phenyl, methylphenyl, dimethylphenyl, trimethylphenyl, methoxyphenyl, dimethoxyphenyl, trimethoxyphenyl, methylolphenyl, dimethylolphenyl, trimethylolphenyl or styryl radicals.

16. A method of forming a macromolecular crosslinked network from an aqueous
30 composition comprising a photocrosslinker according to any of claims 1 to 14 by

irradiating with light exceeding a wavelength of about 305 nm for a time sufficient to form a solid article.

17. A method according to claim 16, wherein said composition further comprises at least one copolymerizable vinylic, acrylic or methacrylic monomer.

18. A method according to claim 16, wherein said composition further comprises a hydrophilic polymer provided with functional vinylic, acrylic or methacrylic groups.

19. A method according to claim 18, wherein said hydrophilic polymer forms discreet crosslinkable units in form of water-soluble particles.

20. A method according to any of claims 16 to 19, wherein an ophthalmic lens is produced from said composition.

21. A method according to any of claim 20, comprising the steps of injecting said composition into the capsular bag of the eye and crosslinking it into a final lens product by irradiation of a wavelength exceeding 305 nm.

22. An ophthalmically acceptable composition comprising the photocrosslinkers according to any of claims 1 to 15 having a refractive index of at least 1.39 and a suitable viscosity to be injected through a standard cannula of 15 Gauge, or finer.

23. The use of photocrosslinkers according to any of claims 1 to 15 in an ophthalmically acceptable composition for injection into the capsular bag of the eye.